

AIR FORCE BASE CONVERSION AGENCY - KELLY
FORMER BUILDING 301 SOIL & GROUNDWATER
BUILDING 360 GROUNDWATER
FINAL PROPOSED PLAN



February 2002

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The purpose of this Proposed Plan is to describe the preferred alternatives for cleaning up soil and groundwater contamination at the former Building 301 and cleaning up groundwater at Building 360 at the former Kelly Air Force Base.

The information includes a brief history of the two sites, and an outline of remedial alternatives for former Building 301 soil and groundwater and for Building 360 groundwater.

INTRODUCTION

This Proposed Plan (PP) identifies the preferred alternative for an interim remedial action for impacted soil and groundwater present at the location of the former Building 301 and impacted groundwater in the immediate vicinity of Building 360. These sites are within Zone 3 at the former Kelly Air Force Base (AFB) in San Antonio, Texas (Figure 1). In addition, this PP includes summaries of other alternatives analyzed for cleaning up former Building 301 soil and groundwater and Building 360 groundwater.

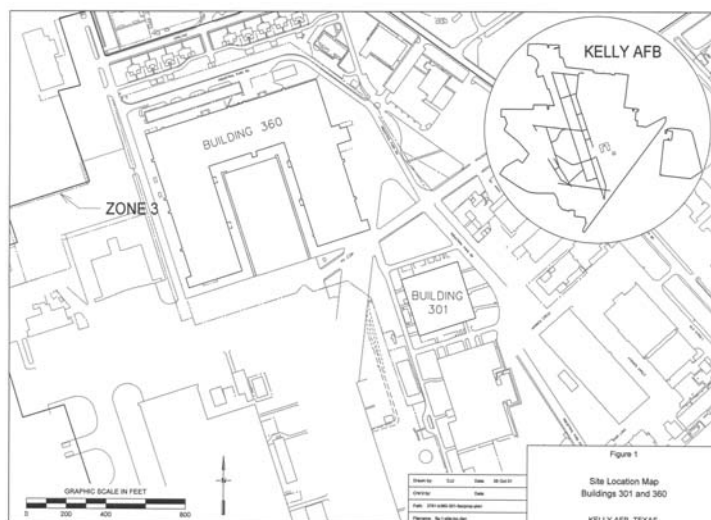


Figure 1 – Location Map
Former Building 301 and Building 360

COMMUNITY INVOLVEMENT

PUBLIC COMMENT PERIOD: February 5, 2002 through March 7, 2002

During the public comment period, you are encouraged to comment on the PP for Former Building 301 Soil and Groundwater and Building 360 Groundwater and the FFS Report. AFBCA, in consultation with TNRCC, may modify the preferred alternative or select another interim remedial action presented in this PP and the FFS Report based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives identified herein. Comments may be submitted either verbally or in writing during the public meeting. Comments may also be submitted through any one of the following:

Mail: Community Involvement Office
"Attention: Former Building 301 and Building 360"
Air Force Base Conversion Agency
143 Billy Mitchell Blvd., Suite 1
San Antonio, TX 78226-1816

Fax: (210) 925-3636
e-mail: vmusgrav@afbda1.hq.af.mil
website: <http://kelly.ch2m.com/empub/home.htm>

All comments should be sent to "Attention: Former Building 301 and Building 360" and should be postmarked or received no later than March 7, 2002

PUBLIC MEETING

Date: February 19, 2002

Time: 5:30 p.m. to 6:30 p.m.

Place: Kennedy High School

You are invited to attend a poster session (prior to a Restoration Advisory Board [RAB] meeting) regarding the interim remedial actions proposed for Former Building 301 Soil and Groundwater and Building 360 Groundwater at the former Kelly AFB. AFBCA representatives will describe the remedial alternatives that were evaluated and discuss the preferred interim remedial action during the poster session prior to the RAB meeting. The public will also have the opportunity to ask questions and comment on the alternatives.

NOTE: Bolded words are defined in the glossary on page 12.

The Zone 2 and Zone 3 **Corrective Measures Study** Report will address the evaluation and selection of final remedial alternatives for all impacted soil and groundwater related to former Building 301 and Building 360. The Air Force Base Conversion Agency (AFBCA), in consultation with the **Texas Natural Resource Conservation Commission (TNRCC)**, will select an interim remedial action for former Building 301 soil and groundwater and Building 360 groundwater only after the public comment period has ended and the information submitted during that time has been reviewed and considered. Therefore, the public is encouraged to review and comment on all the alternatives identified for soil and groundwater in the Building 360 and former Building 301 **Focused Feasibility Study (FFS)** (U.S. Air Force [USAF] 2002).

The U.S. Air Force (Air Force) has completed the following documents that provide information about Building 360 and former Building 301: a **Resource Conservation and Recovery Act (RCRA)** Facility Assessment (United States Environmental Protection Agency [USEPA] 1988), an Interim **Remedial Investigation (RI)** for Groundwater Zone 3 (USAF 1991), an **RI** Report at Zone 3 (USAF 1993), a Contamination Source Evaluation Report for Zone 3 (USAF 1994), a **RCRA** Facility Assessment (RFA) for the Industrial Business Area (USAF 1997), a Basewide Preliminary Assessment/Site Inspection (USAF 1998), a **RCRA** Facility Investigation (RFI) report for the C-5 Area (USAF 1999), and an RFI for Zone 3 that is projected for completion in April 2002. In addition, an **FFS** for former Building 301 soil and groundwater and Building 360 groundwater (USAF 2002) has been completed.

This PP summarizes the interim action selection process, past actions taken, the reason for selecting the preferred alternatives, and a description of the preferred alternatives for impacted media at Building 360 and former Building 301. The PP is not intended to replace the **FFS**, and the public is encouraged to review the **FFS** and other site-related documents in the Administrative Record at the information repositories listed on page 15 of this document.

The Air Force is seeking public comment on the preferred alternatives as well as other interim remedial action alternatives as part of its public participation responsibilities under its existing Public Involvement Plan (USAF 1998), in accordance with the **Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** guidance. To help the public in its review, an overview of the interim remedial action alternatives and the reasons for selecting the preferred alternatives are presented in this PP.

The Air Force's preferred interim remedial action alternative for impacted soil and groundwater at former Building 301 is Alternative 5. Alternative 5 consists of removal of **organic** contaminants by thermally-enhanced **soil vapor extraction (SVE)**. No additional groundwater remediation is required as both impacted soil and groundwater are treated by the same alternative. The Air Force's preferred interim remedial action alternative for impacted groundwater at former Building 360 is Alternative 4 that

consists of groundwater containment by a **permeable reactive barrier (PRB)**.

BACKGROUND

Kelly AFB was founded in 1917 as the first military air base in Texas. Since 1954, the primary mission of Kelly AFB was to provide logistics support and aircraft maintenance for the Air Force. In July 1995, the Defense Base Realignment and Closure Commission recommended that Kelly AFB be closed. Congress accepted this recommendation and Kelly AFB was closed in July 2001. AFBCA now manages the restoration activities at the former Kelly AFB.

The Air Force **Installation Restoration Program (IRP)**, created in 1976 by the Department of Defense (DoD), was structured in response to **CERCLA**. The IRP is the way the DoD identifies and evaluates suspected contamination problems resulting from past hazardous waste disposal practices at DoD facilities. Kelly AFB has responded to impacted soil and groundwater issues in accordance with the IRP. Corrective actions (including interim remedial actions) and groundwater **monitoring** are now conducted by the AFBCA in accordance with the Compliance Plan issued by the TNRCC in 1998.

Environmental investigations at the former Kelly AFB began in 1982. The base was divided into five zones (Zones 1 through 5) where remedial investigation would be focused. Building 360 and the former Building 301 area are located in the central portion of the former Kelly AFB in the northwest part of Zone 3.

Building 360 is an aerospace maintenance facility constructed in 1973. A former parts cleaning operation, located in the west wing of Building 360, included a basement that received drippings from cleaning vats located on the first floor, sumps in the basement, and waste tanks in an open tank vault located just west of Building 360. The open tank vault contained 11 waste tanks that received waste directly from the parts cleaning operation. These tanks were decommissioned and removed between 1997 and May 2000. The basement underlying the first floor directed drippings from the first floor vats (associated with cleaning line operations) toward three sumps located 8 feet below grade along the north wall of the basement. The cleaning line operations on the first floor were discontinued when the Air Force ceased operations at Building 360 in December 1999. Currently, Building 360 is an active aerospace maintenance facility under lease to the Greater Kelly Development Agency.

Former Building 301 has recently been demolished, including removal of all subsurface structures. Former Building 301 included nine sumps inside the building and a container storage area (CSA) located outside the southwest corner of the building. The sumps were placed into operation in 1978. The sumps were located approximately 8 feet below grade inside the southern wall of the building basement and measured 10 feet per dimension. The CSA was taken out of service in 1996 when the concrete slab southwest of the building was demolished.

HISTORY OF REMEDIAL ACTIVITIES AND INVESTIGATIONS

A variety of remedial activities and studies have been performed at former Building 301 and Building 360. (Table 1). They include, but are not limited to the following:

- Preliminary Site Assessment
- Remedial Investigation
- RCRA Facility Assessment
- RCRA Facility Investigation
- **Focused Feasibility Study**

Initial IRP activities began in Zone 3 in 1982 with a Preliminary Assessment/Site Inspection and Hazard Assessment Ranking. The 1991 RI concluded that contamination was more widespread than initially anticipated. The subsequent 1993 Zone 3 RI reported that chlorinated solvent contamination in the shallow groundwater aquifer was widespread throughout Zone 3 and was the primary contributor to unacceptable groundwater risks. Subsequent investigations in Zone 3 (Industrial Business Area RFA, C-5 RFI, and Zone 3 Contamination Source Evaluation Report) focused on specific solid waste management units, including those at Building 360 and former Building 301. The Zone 3 RFI will consolidate all data from these previous investigations.

The Zone 3 RFI data indicates tetrachloroethene (PCE) contamination is present in the vicinity of the CSA at former Building 301. Soil sampling was conducted in 2001 within the footprint of former Building 301 during demolition. This data confirmed the presence of further PCE contamination (and its degradation products) in the area of the sumps and basement within the former building footprint. Figure 2 presents these areas of soil contamination at former Building 301. The Zone 3 RFI also identified widespread chlorinated solvent contamination (principally PCE and its degradation products trichloroethene [TCE] and 1,2-dichloroethene [1,2-DCE]) in the groundwater across Zone 3, with source areas of this contamination evident at the west wing of Building 360 and at former Building 301.

Figure 3 provides a focused view of PCE groundwater contamination in the Building 301/360 area.

CHEMICALS OF CONCERN AND CLEANUP GOALS

AFBCA proposes to remediate former Building 301 soil and groundwater, as well as Building 360 groundwater, to **TNRCC Risk Reduction Standard (RRS) No. 2** (see glossary definition of RRS).

PCE is the chemical of concern for the former Building 301 soils. The **RRS No. 2** value for PCE in soil (500 parts per billion [ppb]) will be used as the applicable cleanup standard. Under a **RRS No. 2** closure, contaminated soil must be removed or **remediated** to the **RRS No. 2** cleanup standard.

PCE and degradation products of PCE are of concern for groundwater in the vicinity of the Building 360 and former Building 301. The **RRS No. 2** value for PCE in groundwater (5 ppb) will be used as the cleanup standard for PCE in groundwater near former Building 301 and Building 360. The groundwater cleanup standard for degradation products TCE and 1,2-DCE are 5 ppb and 70 ppb, respectively.

CURRENT CONCEPTUAL MODEL OF FORMER BUILDING 301 AND BUILDING 360

Former Building 301 was a metal-plating facility. Contaminant sources associated with former Building 301 include a basement area that received drippings from plating vats on the first floor, sumps inside the building, and a CSA located outside the southwest corner of the building. Building 301 was recently demolished, including removal of all subsurface structures. Soil contamination (PCE) resulting from these operations is present in Areas A through F shown in Figure 2.

Building 360 is an aerospace maintenance facility. Contaminant sources associated with Building 360 include an open tank vault, located outside the west wing of the building, and a basement that received drippings from vats located on the first floor of the west wing. Both of these areas are associated with a former parts cleaning operation located in the same area of the building.

From Building 360, groundwater flows to the southeast and southwest, while in the area of former Building 301, it flows to the southeast. The largest extent of groundwater contamination is represented in Figure 3 by the contaminant PCE. Thus, groundwater contamination emanates from the west wing of Building 360. The eastern lobe of this contaminant plume is replenished by contamination from the former Building 301 area.

Preliminary Assessment 1982-1988	Remedial Investigation 1989-1993	RCRA Facility Assessment 1996-1997	RCRA Facility Investigation 1999-2002	Focused Feasibility Study 2002	Public Comment Period 2002	Interim Action Implementation 2002	Corrective Measures Study 2002	Corrective Measures Implementation Work Plan 2002-2003	Corrective Measures Implementation 2004	Monitoring (Operating Properly and Successfully)
ACTIVITIES COMPLETED					FUTURE ACTIVITIES					

Table 1 – Timeline of the Former Building 301 and Building 360 Restoration Process at the Former Kelly AFB

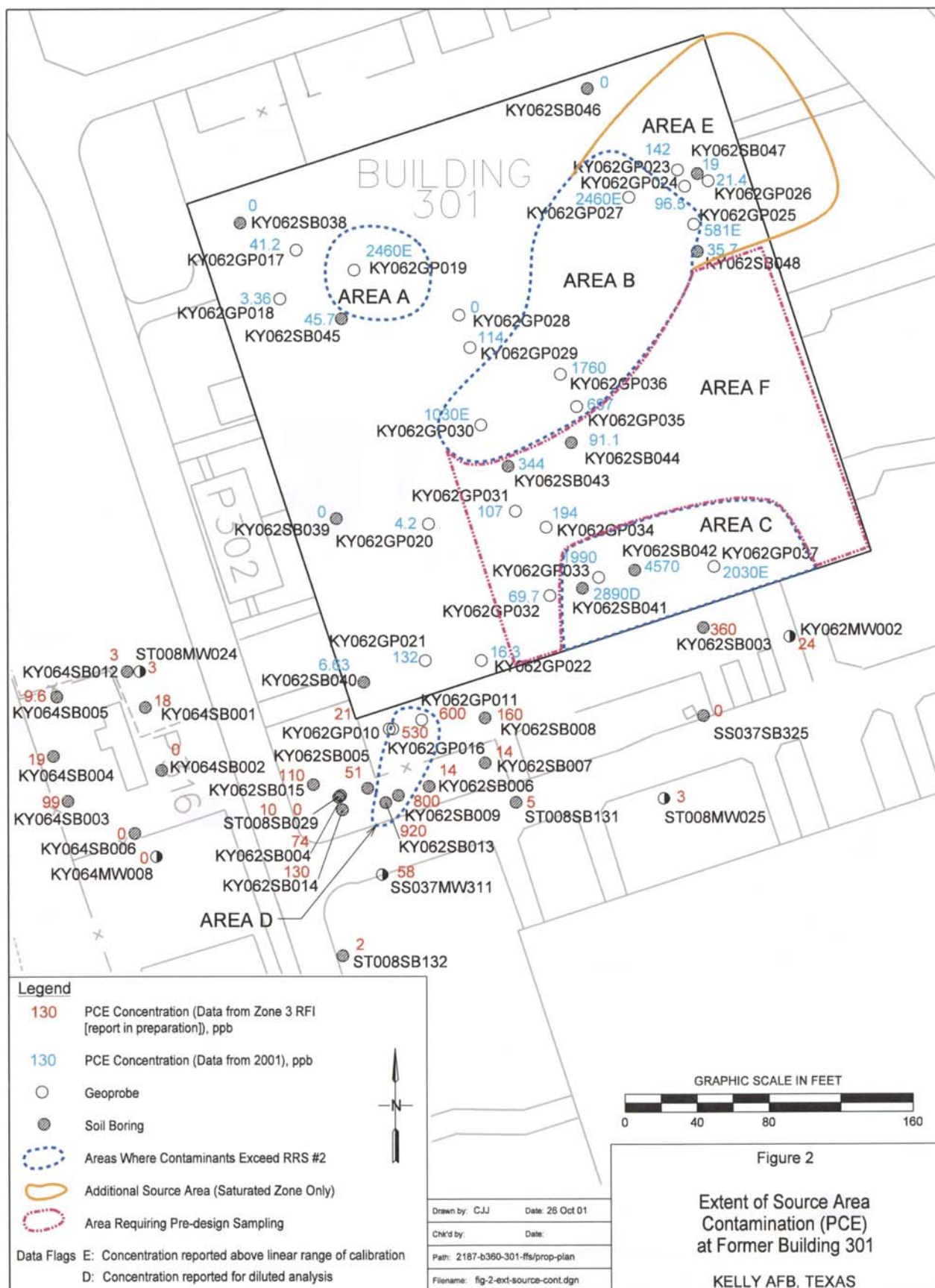
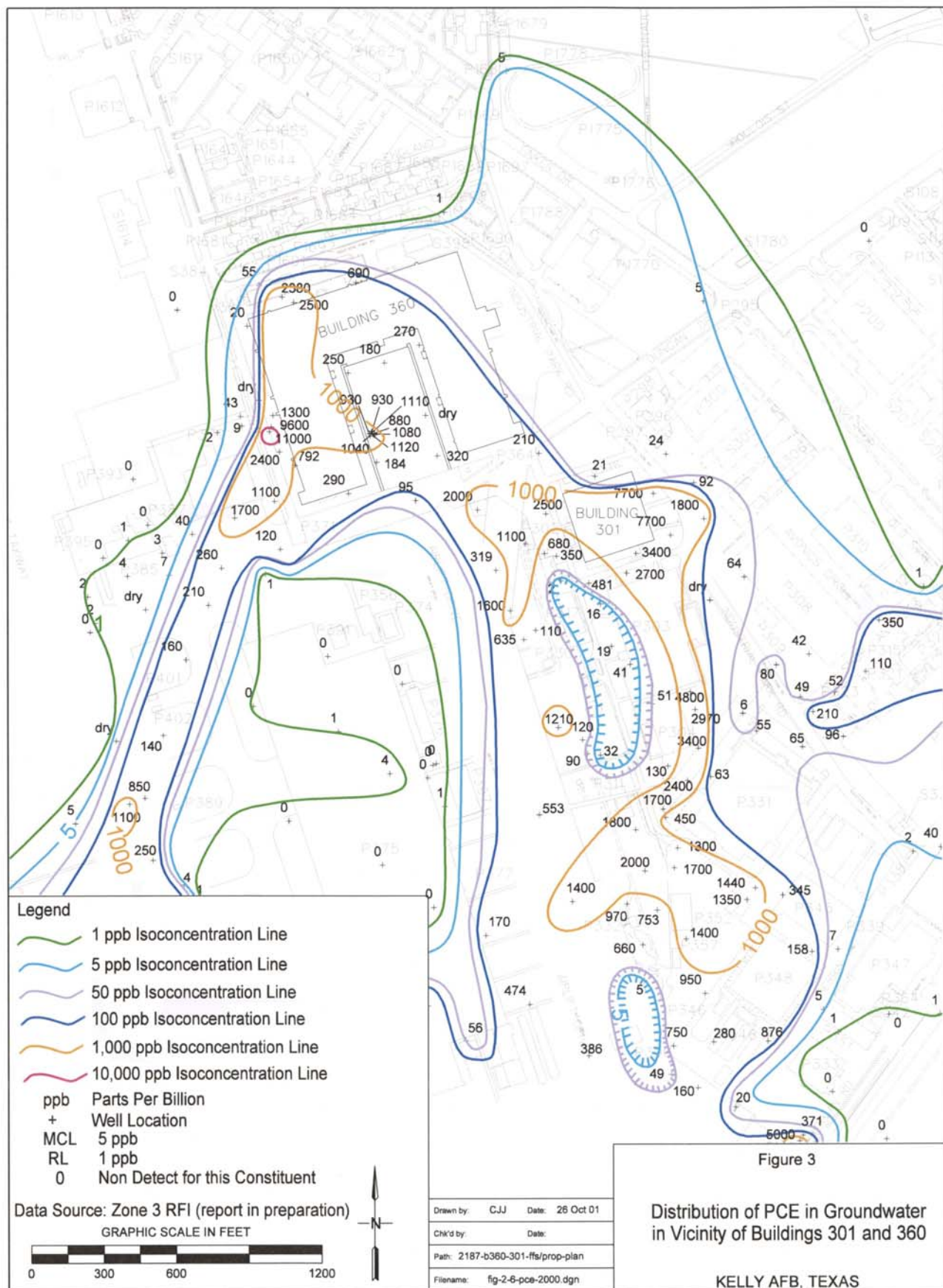


Figure 2 – Specific Area of Soil Contamination
Former Building 301



**Figure 3 – Distribution of PCE in Groundwater
Building 360 and Former Building 301**

SUMMARY OF INTERIM REMEDIAL ACTION ALTERNATIVES

The general remedial strategy for the former Building 301 source involves removal of the soil contaminants pursuant to a **RRS** No. 2 closure. The general remedial strategy for the groundwater in the immediate vicinity of former Building 301 and Building 360 involves removal, destruction, or immobilization of the contaminant plume to prevent downgradient contaminant migration. Remediation technologies for addressing contaminated soil and groundwater are discussed in detail in the **FFS**.

The following technologies were considered for remediation of **organic** contaminants to achieve a **RRS** No. 2 closure for soils at former Building 301 and to prevent further downgradient migration of source area groundwater contaminants at former Building 301 and Building 360:

Soil Remedial Technologies

- **Excavation**
- **Surface Capping**
- **Soil Vapor Extraction (SVE)**
- **Thermally-Enhanced SVE**

Groundwater Remedial and Containment Technologies

- **Bioaugmentation**
- **Slurry Wall**
- **Permeable Reactive Barrier (PRB)**
- **Pump and Treat**

In general, all remedial alternatives include the following components:

- **Institutional controls** of industrial land use and restrictions on the use of the shallow groundwater.
- Groundwater **monitoring** for evaluating the effectiveness of the remedial measures.

Tables 2 through 4 in the following sections present the alternatives for former Building 301 soil and groundwater and Building 360 groundwater.

Alternatives for Former Building 301 Soil:

All alternatives for former Building 301 soil were evaluated under an **RRS** No. 2 closure scenario. Table 2 summarizes the remedial alternatives for former Building 301 soil.

No.	Alternative
1	No Action
2	Engineered Surface Cap
3	Excavation and Dewatering
4	Soil Vapor Extraction
5	Thermally-Enhanced Soil Vapor Extraction

Table 2 – Summary of Soil Alternatives at Former Building 301

Building 301 Soil Alternative 1: No Action. The no action alternative is included to provide a baseline for evaluation of remedial alternatives as required under **CERCLA**.

Building 301 Soil Alternative 2: Engineered Surface Cap of Soils. An engineered cap will be constructed to prevent leaching of organic contaminants remaining in the vadose zone. The total area to be capped will encompass the entire footprint of former Building 301 and the CSA area beyond the southwest side of the former Building 301.

Building 301 Soil Alternative 3: Complete Excavation and Off-Site Disposal of Soils. Alternative 3 involves the complete **excavation** (to an average depth of 26 feet below ground surface) and off-site disposal of soil from impacted areas A-F. All excavated areas will be backfilled with clean fill to surface level. Groundwater resulting from dewatering activities during excavation will be pumped to the existing groundwater treatment plant (GWTP) for **treatment** and discharge to Leon Creek in accordance with the discharge permit.

Building 301 Soil Alternative 4: Soil Vapor Extraction with Water Table Depression. SVE will be used to remove **organic** contaminants in soil Areas A-F. Each SVE well will be designed to target vadose zone clays and saturated zone gravelly clays. Systems for SVE blowers, condensate collection, vapor treatment (i.e., granular-activated carbon), and compressor for driving dewatering pumps will be constructed onsite. The groundwater will be pumped to the existing GWTP for **treatment** and discharge to Leon Creek. The estimated operation period for soil vapor extraction and dewatering is 5 years.

Building 301 Soil Alternative 5: Thermally-Enhanced SVE. A thermally-enhanced (**six-phase heating**) SVE system will be used to remove **organic** contaminants from impacted soil in Areas A-F. This process uses electrodes inserted into the soil to heat the soil and contaminants to the boiling point of water, thus helping the recovery by **SVE**. The estimated installation and operation period for the thermally-enhanced **SVE** system is approximately nine months.

Alternatives for Former Building 301 Groundwater:

All alternatives for former Building 301 groundwater were evaluated as interim actions in support of an eventual **RRS** No. 3 closure scenario for Zone 3 groundwater. Table 3 summarizes the remedial alternatives for former Building 301 groundwater.

No.	Alternative
1	No Action
2	Slurry Wall with Hydraulic Control
3	Permeable Reactive Barrier
4	Pump and Treat Wells

Table 3 – Summary of Former Building 301 Groundwater Containment Alternatives

Building 301 Groundwater Alternative 1: No Action. The no action alternative is included to provide a baseline for evaluation of remedial alternatives as required under **CERCLA**.

Building 301 Groundwater Alternative 2: Slurry Wall with Hydraulic Control. A **slurry wall** will be built immediately adjacent to and down gradient of the site for groundwater **containment**. The length of the wall will be approximately 1,050 feet. Two **groundwater recovery wells** placed inside the **slurry wall** will make sure groundwater contamination does not leave the **slurry wall** area. The groundwater will be pumped to the existing GWTP for **treatment** and discharge to Leon Creek.

Building 301 Groundwater Alternative 3: Permeable Reactive Barrier (PRB). Contaminated groundwater will be contained and **remediated** by a **PRB** constructed immediately down gradient from the site. The recommended configuration of the **PRB** is as a funnel and gate system with a total length of 700 feet. The gate portion will be approximately 120 feet long and 10 feet thick. The **PRB** will be designed for **remediation** of the chlorinated solvents in groundwater.

Building 301 Groundwater Alternative 4: Pump and Treat Wells. One existing **groundwater recovery well** on the south end of the building and a new **groundwater recovery well** to be installed on the northeast corner of former Building 301 will be used to contain groundwater contamination in the former Building 301 area. The groundwater will be pumped to the existing GWTP for **treatment** and discharge to Leon Creek.

Alternatives for Building 360 Groundwater:

All alternatives for Building 360 groundwater were evaluated as interim actions in support of an eventual **RRS** No. 3 closure scenario for Zone 3 groundwater. Table 4 summarizes the remedial alternatives for Building 360 groundwater.

No.	Alternative
1	No Action
2	Bioaugmentation
3	Slurry Wall with Hydraulic Control
4	Permeable Reactive Barrier
5	Pump and Treat Wells

Table 4 – Summary of Building 360 Groundwater Containment Alternatives

Building 360 Groundwater Alternative 1: No Action. The no action alternative is included to provide a baseline for evaluation of remedial alternatives as required under **CERCLA**.

Building 360 Groundwater Alternative 2: Bioaugmentation. A system of infiltration trenches and **groundwater recovery wells** will be constructed in the Building 360 area for the purpose of delivering nutrients and initial introduction of microbes to the groundwater. The

trenches and wells will be placed such that groundwater flow containing nutrients and microbes is drawn through the contaminated areas. Water and nutrients extracted at **groundwater recovery wells** will be recirculated back to the infiltration trenches.

Building 360 Groundwater Alternative 3: Slurry Wall with Hydraulic Control. A **slurry wall** will be built immediately adjacent to and down gradient of the west wing of Building 360 for groundwater **containment**. The length of the wall will be approximately 1,400 feet. Two groundwater recovery wells, placed on either side of the west wing of Building 360, will be used to make sure groundwater contamination does not leave the **slurry wall** area. The groundwater will be pumped to the existing GWTP for **treatment** and discharge to Leon Creek.

Building 360 Groundwater Alternative 4: Permeable Reactive Barrier (PRB). Contaminated groundwater will be contained and **remediated** by two **PRBs** constructed immediately east and immediately west of the west wing of Building 360. The proposed configuration for the **PRBs** are two continuous 600 foot long walls, 2 to 2.5 feet thick. The **PRBs** will be designed for **remediation** of the chlorinated solvents in groundwater.

Building 360 Groundwater Alternative 5: Pump and Treat Wells. One existing **groundwater recovery well** on the east side of the west wing of the building and a new **groundwater recovery well** to be installed on the west side of Building 360 will be used to contain groundwater contamination in the Building 360 area. The groundwater will be pumped to the existing GWTP for **treatment** and discharge to Leon Creek.

EVALUATION OF ALTERNATIVES

The Air Force used nine criteria recommended by federal **U.S. Environmental Protection Agency** regulatory guidance (USEPA 1988) to evaluate the alternatives developed in the **FFS** for former Building 301 soil and groundwater and Building 360 groundwater (Table 5). Each alternative must completely meet the threshold criteria. The five primary criteria are used to refine the preferred alternative selection. The last two modifying criteria, state agency comment and community comment, will be evaluated following the comment period on the **FFS** and this PP and will be addressed once a final decision is made. A summary of the evaluation of each of the five alternatives against these criteria is presented in Tables 6, 7, and 8.

PREFERRED ALTERNATIVE

Former Building 301 Soil and Groundwater:

Based on the evaluation of alternatives presented for former Building 301 soil and groundwater, two different alternatives (one a combination of alternatives) were retained for final consideration. These are **SVE**

(Alternative 4) combined with **PRB** (Alternative 3), and thermally-enhanced **SVE** (Alternative 5). The latter was not combined with a groundwater alternative because the remedial action is expected to be completed in a short period of time and to result in full removal of VOCs from both the soil and groundwater zones. The other alternatives evaluated were rejected for various reasons. Alternative 2 for soil was rejected because it did not remove contamination as required by **RRS** No. 2. Alternative 3 was rejected based on excessive cost. All the groundwater alternatives are fairly similar with respect to environmental protection and cost. Alternatives 2 and 4 were rejected primarily based on slightly higher costs attributable to the requirement for groundwater recovery and treatment.

Of the retained alternatives, **SVE** combined with **PRB** is a conventional remedial approach which, when applied to the PCE-contaminated soil at former Building 301, is expected to take several years to reach the **RRS** No. 2 cleanup standard. Thermally-enhanced **SVE** results in a much quicker contaminant removal rate from both soil and groundwater zones than **SVE** alone. A groundwater **containment** technology is not needed, because thermally-enhanced **SVE** removes contaminants from both zones in a short time period. Based on lower cost and shorter implementation time, soil Alternative 5 is the recommended alternative for soil and groundwater at the former Building 301.

Building 360 Groundwater:

Based on the detailed evaluation of alternatives presented for Building 360 groundwater, one alternative was retained for final consideration - the **PRB** alternative (Alternative 4). The other alternatives were rejected for various reasons. Alternative 2 was rejected (even though it had the lowest cost) because it was expected to be difficult to control the hydraulic aspects of the system based on the **bioaugmentation** pilot test at Building 360. Alternatives 3, 4, and 5 all provide groundwater **containment** by various means. Alternatives 3 and 5 are similar in that both involve **groundwater recovery** and **treatment**. Active recovery systems are not desirable in these areas because of the goal to minimize long-term interference to the Building 360 tenant operations. Alternative 4 does not require **groundwater recovery** because it is based on in situ treatment. The in situ approach of Alternative 4 is more favorable than the continual operation and maintenance necessary to maintain the groundwater transport and **treatment** systems of Alternatives 3 and 5. Also, the cost of Alternative 4 is slightly less than that of Alternatives 3 and 5 because long-term operation and maintenance is not required. Therefore, Alternative 4 is the recommended remedial alternative for groundwater at Building 360.

EVALUATION CRITERIA FOR REMEDIAL ALTERNATIVES

Threshold Criteria

Overall Protectiveness of Human Health and the Environment evaluates whether an alternative eliminates, reduces, or controls threat to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with Applicable Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets Federal and State Environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Primary Criteria

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement an alternative and the risk the alternative poses to workers, residents, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operations and maintenance costs. Cost estimates are expected to be accurate within a range of +50 to - 30 percent.

Modifying Criteria

State Comment considers the State input regarding the USAF analyses and recommendations, as described in the FFS and the Proposed Plan.

Community Comment considers the local community input regarding the USAF analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Table 5 – Summary of Evaluation Criteria

Alternative	Alternative 1: No Action	Alternative 2: Engineered Surface Cap	Alternative 3: Vadose and Saturated Soil Excavation, with Dewatering	Alternative 4: SVE Only	Alternative 5: Thermally-enhanced SVE
Criterion					
Overall protection of human health and the environment.	All alternatives, except Alternative 1, provide adequate protection of human health and environment.				
Compliance with ARARs.	SOIL: Cleanup goals not met because contaminated soils not removed from site.	SOIL: Cleanup goals not met because contaminated soils not removed from site.	SOIL: Cleanup goals met through removal of contaminated vadose and saturated zone soils.	SOIL: Cleanup goals met through SVE removal of VOC contaminants.	SOIL: Cleanup goals attained readily through thermally-enhanced SVE removal of VOC contaminants.
Long-term Effectiveness and Permanence.	Not Applicable.	Long-term effectiveness dependent on construction quality and integrity of surface cap.	High reliability and effectiveness.	High reliability and effectiveness.	High reliability (pilot test to be conducted in 2002).
Reduction in the toxicity, mobility, or volume of wastes.	No reduction in waste toxicity, mobility or volume.	Cap significantly reduces contaminant mobility. Minor reduction in waste volume due to natural attenuation.	Major reduction in waste volume by excavation.	SVE reduces waste volume by organic mass removal.	SVE reduces waste volume by organic mass removal.
Short-term effectiveness.	Not Applicable.	Risks to community health limited because contaminants are left in place.	Risks to community health limited to off-base trucking of soils for disposal, which can be properly managed to minimize impact.	Risks to community health limited to vapor emissions from SVE system, which can be mitigated by appropriate treatment processes.	Risks to community health limited to vapor emissions from SVE system, which can be mitigated by appropriate treatment processes.
Implementability.	All alternatives represent high implementability (site constructability, availability of technologies, goods, and services).				
Total Cost (including 30-year O&M period).	\$0	\$1.0 MM	\$17.8 MM	\$5.8 MM	\$3.5 MM
ARAR Applicable or Relevant and Appropriate Requirement MM millions SVE soil vapor extraction PRB permeable reactive barrier O&M operations and maintenance NOTE: The state and community criteria will be evaluated for each alternative after the public comment period.					

Table 6 – Summary of Detailed Evaluation of Interim Remedial Action Alternatives for Former Building 301 Soil

Alternative Criterion	Alternative 1: No Action	Alternative 2: Slurry Wall with Hydraulic Control	Alternative 3: Permeable Reactive Barrier (PRB)	Alternative 4: Pump and Treat Wells
Overall protection of human health and the environment.	All alternatives, except Alternative 1, provide adequate protection of human health and environment.			
Compliance with ARARs.	GROUNDWATER: Cleanup goals not met.	GROUNDWATER: Cleanup goals met through pumping of contaminated groundwater.	GROUNDWATER: Cleanup goals met through PRB remediation of organics.	GROUNDWATER: Cleanup goals met through pumping of contaminated groundwater.
Long-term Effectiveness and Permanence.	Not Applicable.	High reliability and effectiveness, provided proper hydraulic control is maintained.	Reliability and effectiveness dependent on construction quality and monitoring of media reactivity.	High reliability and effectiveness, provided proper hydraulic control is maintained.
Reduction in the toxicity, mobility, or volume of wastes.	No reduction in waste toxicity, mobility or volume.	Slurry wall eliminates waste mobility and pumping of contaminated groundwater reduces volume of waste.	Groundwater waste volume reduced by remediation in PRB system.	Pumping contaminated groundwater reduces waste volume.
Short-term effectiveness.	Not Applicable.	Risks to community health limited to off-base trucking of minor amounts of soils for disposal, which can be properly managed to minimize impact.	Risks to community health limited to off-base trucking of minor amounts of soils for disposal, which can be properly managed to minimize impact.	Risks to community health limited to off-base trucking of minor amounts of soils for disposal, which can be properly managed to minimize impact.
Implementability.	All alternatives represent high implementability (site constructability, availability of technologies, goods, and services).			
Total Cost (including 30-year O&M period).	\$0	\$3.7 MM	\$3.2 MM	\$5.1 MM
ARAR MM	Applicable or Relevant and Appropriate Requirement millions			
	SVE soil vapor extraction PRB permeable reactive barrier			
	O&M operations and maintenance			
NOTE: The state and community criteria will be evaluated for each alternative after the public comment period.				

Table 7 – Summary of Detailed Evaluation of Interim Remedial Action Alternatives for Former Building 301 Groundwater

Alternative	Alternative 1: No Action	Alternative 3: Bioaugmentation	Alternative 3: Slurry Wall with Hydraulic Control	Alternative 4: Permeable Reactive Barrier (PRB)	Alternative 5: Pump and Treat Wells
Criterion					
Overall protection of human health and the environment.	All alternatives, except Alternative 1, provide adequate protection of human health and environment.				
Compliance with ARARs.	GROUNDWATER: Cleanup goals not met.	GROUNDWATER: Cleanup goals met through in situ biodegradation of organic contaminants.	GROUNDWATER: Cleanup goals met through pumping of contaminated groundwater.	GROUNDWATER: Cleanup goals met through PRB remediation of organics.	GROUNDWATER: Cleanup goals met through pumping of contaminated groundwater.
Long-term Effectiveness and Permanence.	Not Applicable.	Adequate reliability and effectiveness, provided proper hydraulic control is maintained.	High reliability and effectiveness, provided proper hydraulic control is maintained.	Reliability and effectiveness dependent on construction quality and monitoring of media reactivity.	High reliability and effectiveness, provided proper hydraulic control is maintained.
Reduction in the toxicity, mobility, or volume of wastes.	No reduction in waste toxicity, mobility, or volume.	Bioaugmentation reduces waste volume by in situ destruction.	Slurry wall eliminates waste mobility and pumping of contaminated groundwater reduces volume of waste.	Groundwater waste volume reduced by remediation in PRB system.	Pumping contaminated groundwater reduces waste volume.
Short-term effectiveness.	Not Applicable.	Risks to community health limited to off-base trucking of minor amounts of soils for disposal, which can be properly managed to minimize impact.	Risks to community health limited to off-base trucking of minor amounts of soils for disposal, which can be properly managed to minimize impact.	Risks to community health limited to off-base trucking of minor amounts of soils for disposal, which can be properly managed to minimize impact.	Risks to community health limited to off-base trucking of minor amounts of soils for disposal, which can be properly managed to minimize impact.
Implementability.	All alternatives represent high implementability (site constructability, availability of technologies, goods, and services).				
Total Cost (including 30-year O&M period).	\$0	\$3.1 MM	\$4.1 MM	\$3.6 MM	\$4.7 MM
ARAR	Applicable or Relevant and Appropriate Requirement		SVE	O&M	
MM	millions		PRB	operations and maintenance	
NOTE: The state and community criteria will be evaluated for each alternative after the public comment period.					

Table 8 – Summary of Detailed Evaluation of Interim Remedial Action Alternatives for Building 360 Groundwater

GLOSSARY OF TERMS

Bioaugmentation-process of adding specialized bacteria cultures to groundwater along with electron donors and/or other nutrients in order to stimulate or accelerate in situ biodegradation of chlorinated solvents.

Carcinogen-a substance known to cause cancer.

Chemical of Concern (COC)-site-related chemicals identified as the specific contaminants to be addressed by the remedial actions at the site.

Cleanup Goal-contaminant concentration levels that are considered protective of human health and the environment (i.e., concentrations below these levels do not pose an unacceptable risk to human health or the environment).

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-commonly referred to as "Superfund," this federal law addresses abandoned and inactive hazardous waste sites that pose a risk to human health and the environment.

Containment-control of groundwater contaminant migration by means such as groundwater extraction, in situ treatment, or barrier technologies such as a slurry wall.

Corrective Measures Study-RCRA corrective action process to identify and evaluate potential remedial alternatives for releases that have been identified at a facility.

Dewatering-temporary removal of groundwater so that soil excavation can be carried out in the saturated zone.

Excavation-removal of contaminated soil from source areas by using a backhoe or similar equipment. The excavated soils are hauled off to another location for treatment or disposal.

Focused Feasibility Study (FFS)-a study undertaken by the lead agency to develop and evaluate options for an interim remedial cleanup action.

Groundwater Extraction (Recovery Wells)-the use of groundwater recovery wells to extract groundwater for treatment at another location and disposal.

Inorganics-chemical constituents such as metals that do not have carbon in them.

Installation Restoration Program (IRP)-the DoD program designed to identify, report, and correct environmental deficiencies at DoD installations.

Institutional Controls-administrative and/or legal means, such as deed recordation or municipal ordinances, to restrict exposure to contaminated soil or groundwater.

Monitoring-ongoing collection of field information about the environment that helps gauge the effectiveness of a cleanup action.

Noncarcinogen-a substance not proved to cause cancer.

Organics-chemical constituents, such as solvents and fuels, containing carbon.

Permeable Reactive Barriers (PRB)-these in-ground barriers allow the passage of clean water through them while prohibiting the movement of contaminants. This is done by employing compounds such as oxidizing agents, sorbents, or microbes.

Remedial Investigation (RI)-a study undertaken by the lead agency to determine the nature and extent of the problem presented by a release. The RI emphasizes data collection and site characterization.

Remediation-a cleanup action to remove or contain a release of hazardous material.

GLOSSARY OF TERMS (cont.)

Resource Conservation and Recovery Act (RCRA)-this federal law addresses the generation, transport, treatment, storage, and disposal of hazardous waste.

Risk-the probability of an undesired effect.

Risk Reduction Standards (RRS)-The risk-based cleanup standards implemented by the TNRCC for hazardous waste site cleanup.

Six-Phased Heating-a soil heating technology involving the splitting of conventional three-phase electrical supply into six separate electrical phases for improved subsurface heat distribution. Each phase is delivered to one of six electrodes arranged in a hexagonal pattern at the treatment area. Contaminants in the soil are then vaporized and removed by SVE.

Slurry Wall-a narrow trench filled with low-permeability material to control the migration of contaminated groundwater. The installation involves excavating a narrow trench, which is filled with fluid (i.e., slurry). Bentonite is the most common material used for slurry trenching.

Soil Vapor Extraction (SVE)-treatment technology that uses vacuum blowers and vapor extraction wells to strip volatile organics (VOCs) from unsaturated soil.

Texas Natural Resources Conservation Commission (TNRCC)-the state organization responsible for overseeing cleanup of hazardous waste sites.

Treatment-a method or process that changes the chemical or physical nature of a contaminant so as to neutralize its hazardous effects.

U.S. Environmental Protection Agency (USEPA)-the federal organization responsible for overseeing cleanup of hazardous waste sites.

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Whom Do I Call if I Have a Question?

Kelly Public Information Line
Tel: (210) 925-0956 (available in Spanish or English)
FAX: (210) 925-3636

Or mail questions/comments to:
Vanessa Musgrave
Community Involvement Office
Air Force Base Conversion Agency
143 Billy Mitchell Blvd., Suite 1
San Antonio, TX 78226-1816

Where Can I Review the Building 360 and Former Building 301 Report?

You can review the Building 360 and Former Building 301 FFS and other soil and groundwater documents at the information repositories located at:

San Antonio Library
Government Documents Section
Second Floor
600 Soledad
San Antonio, TX 78204
Tel: (210) 207-2500

Kelly Library
Building 1650, Room 138
250 Goodrich Dr., Suite 6
San Antonio, TX 78241-5806
Tel: (210) 925-4116

Mailing List Coupon

If you would like to receive further information about environmental activities at former Kelly AFB, please complete the form, clip, and mail to:

Vanessa Musgrave
Attn: Mailing List
Community Involvement Office
Air Force Base Conversion Agency
143 Billy Mitchell Blvd., Suite 1
San Antonio, TX 78226-1816
Tel: (210) 925-0956 (available in Spanish or English)

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